

EXPLANATION OF PLATE LVII.

- Fig. 1. *Chryso nivipictus*, p. 764. 1 a. Eyes.
 2. — *cordiformis*, p. 763.
 3. *Meta splendida*, p. 765. 3 a. Eyes. 3 b. Male palpus.
 4. *Phoroncidia aurata*, p. 766. 4 a. Eyes. 4 b. Var. *argentata*, in profile.
 5. *Gasteracantha cowani*, p. 766. 5 a. Eyes.
 6. *Uloborus velutinus*, p. 767. 6 a. Eyes. 6 b. Profile.
 7. *Thwaitesia pulcherrima*, p. 764. 7 a. Eyes. 7 b. Profile.

11. On some Points in the Anatomy of the Indian Tapir (*Tapirus indicus*). By W. NEWTON PARKER, Lecturer on Biology at the University College of Wales, Aberystwyth.

[Received December 9, 1882.]

(Plates LVIII., LIX.)

While acting as Prosecutor to the Society during Mr. Forbes's absence in W. Africa, I have had the opportunity of dissecting a young male Indian Tapir, a few points in the anatomy of which I now lay before the Society.

The animal, which only arrived at the Gardens in July last, was probably about eighteen months old when it was unfortunately found necessary to kill it, on October 9th, on account of its suffering from an incurable *prolapsus ani*. It measured about four feet from the tip of the nose to the tip of the tail, and had not grown perceptibly since its arrival in this country.

On opening the body the lungs were found to be much diseased, and presented considerable adherence to the thoracic cavity; the liver was also very soft. There were decided traces of rickets, the sternal ribs having several nodular enlargements.

The general anatomy of the Indian Tapir has been described by Home¹, Cantor², Poelman³, and Murie⁴. Some points, however, have not received much attention; and in others there seems to be a considerable amount of variation. I therefore trust that the following account of certain of the organs will not be without interest.

The Alimentary Canal.—The hard palate presented the usual double row of transverse ridges, of which there were seventeen on the left side and eighteen on the right. The naso-palatine canals open on each side of a small elevation about $\frac{2}{3}$ inch from the posterior border of the middle incisors. The soft palate embraces the base of the epiglottis, much as in the Horse.

The tongue has a pointed apex, and increases slightly in breadth from before backwards. It measured 8 inches in length and $2\frac{3}{8}$ inches in breadth at the base. Its upper surface is covered by delicate filiform papillæ. Fungiform papillæ are also numerous, and

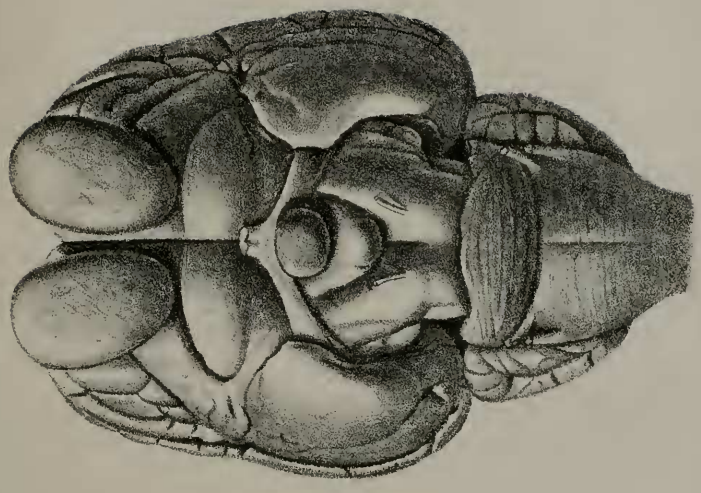
¹ Phil. Trans. 1821, p. 272.

² Journ. Asiat. Soc. vol. xv. 1846, p. 263.

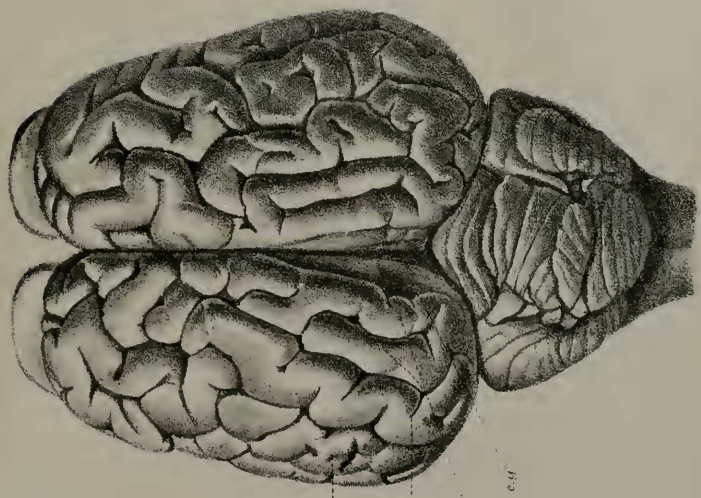
³ Mém. de l'Acad. Roy. de Belgique, tom. xxvii. 1853.

⁴ Journ. Anat. and Physiol. vol. vi. 1871, p. 131.

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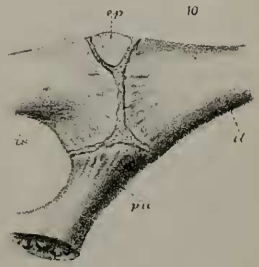
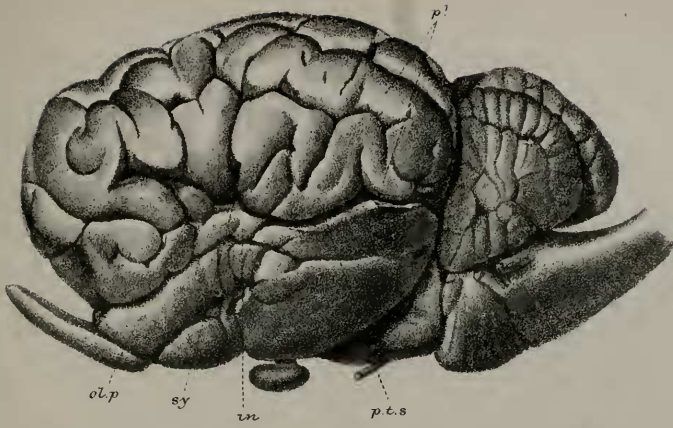


p¹.....
 p².....
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 c.14

Brain of *Tapirus indicus*



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M.P. Parker lith

Tapirus indicus.

West, Newman & Co. 1880

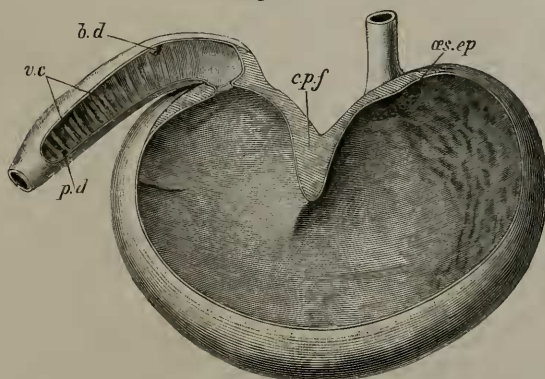


are distributed mainly over the anterior $2\frac{1}{2}$ inches and the posterior part, there being a space of about 2 inches between these regions which is destitute of them; there is also an irregular row along each edge. There is a distinct Mayer's organ (*papilla foliata*) on each side, about half an inch long, on the upper edge of the root of the tongue. The frenum was attached about 3 inches from the apex.

The salivary glands resemble those of the Horse in every important particular. The parotids are large, extending from the front part of the hinge of the lower jaw to the paroccipital process. Steno's duct passes down along the lower edge of the masseter, and then runs up again so as to open by an aperture with well-marked lips about $\frac{3}{8}$ inch from the upper molar teeth, opposite the line of apposition of the second and third molars. The submaxillary and sublingual glands were also large, their ducts opening in the usual position. Upper and lower molar glands were present; and there was a large palatal gland over the velum palati. The tonsils did not present any definite elevations, the glands composing them being scattered. Each thyroid was about 1 inch long, and was connected with its fellow by a bridge $\frac{3}{8}$ of an inch in width.

Poelman figures an external view of the stomach, which, however, does not represent it quite accurately. I therefore give another figure (fig. 1), showing its internal structure.

Fig. 1.



The stomach, laid open, from the posterior side, one fourth nat. size.

c. p. f., cardio-pyloric fold; *æ. s. ep.*, œsophageal epithelium; *b. d.*, bile-duct; *p. d.*, pancreatic duct; *v. c.*, valvuli conniventes.

The stomach measured about two feet along the greater curvature. There is a marked constriction between the entrance of the œsophagus and the duodenum, about halfway between the two, and not close to the duodenum as in Poelman's figure, in which

also the œsophagus and duodenum, the latter especially, are represented of much too small a diameter and too far apart, thus, as Dr. Murie points out, making the lesser curvature smaller than depicted. From the cardio-pyloric constriction there extends inwards for about 2 inches a thickened muscular septum (*c.p. f.*), which partially divides the stomach into a cardiac and a pyloric chamber, of which the cardiac is slightly the larger.

The epithelial lining of the œsophagus extends into the stomach for about an inch all round from the cardia (*œs. ep.*). In this it differs from *T. americanus*¹, in which the œsophageal epithelium extends much further over the interior of the stomach, more like the arrangement in the Rhinoceros and Horse. The greater part of the mucous membrane is very smooth; but for a region extending round the cardiac portion of the greater curvature it is considerably ridged. There are also a few slight ridges in the pyloric end. The muscular coat thickens considerably towards the pylorus; and there is a well-marked circular pyloric valve.

The duodenum is of considerably greater diameter than the cardiac end of the œsophagus; but it narrows slightly after about the first 5 inches, the rest of the small intestine having an average diameter of about $1\frac{3}{8}$ inch.

The liver has been figured by Murie; but his sketch differs consi-

Fig. 2.

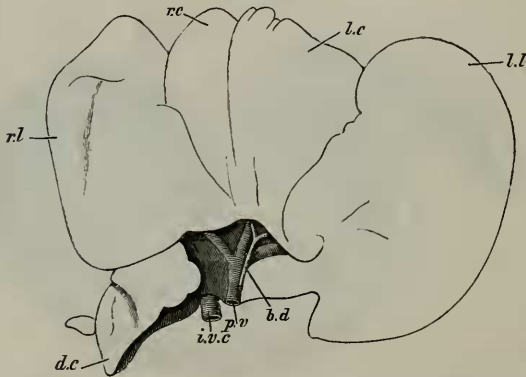


Diagram of the liver, from the posterior aspect, three-eighths nat. size.

r. c., right, and *l. c.*, left central lobe; *r. l.*, right, and *l. l.*, left lateral lobe; *d. c.*, caudate lobe; *b. d.*, bile-duct; *p. v.*, portal vein; *i. v. c.*, vena cava.

derably from this gland in the specimen under consideration; and I therefore give a figure for comparison (fig. 2), to show that this organ, as in many other Ungulates, may vary considerably in form.

¹ See Owen, Proc. Zool. Soc. 1841, p. 161.

The right and left central lobes were only partially separated from one another, the umbilical fissure extending only a short way down on the anterior side. The margin of the left central lobe presented several small notches towards its right side. Both right and left lateral lobes were large; and there was a considerable caudate lobe, projecting from the outer side of which there was a small leaf-like minor lobe. There was no *lobus Spigelii*; in Dr. Murie's figure a large one is shown, but no caudate; he states that a small lobule lying on the vena cava might represent the latter.

There is no gall-bladder; and the bile-duct opens on a papilla into the duodenum about 3 inches from the pylorus. A separate pancreatic duct opens about $3\frac{1}{2}$ inches further back.

The spleen is elongated and flattened; it measured 1 foot long, and about 4 inches broad in the widest part.

It has usually been stated that the intestinal canal is much shorter in the American than in the Indian Tapir; but the measurements given by different anatomists vary so much that it is impossible to make any very definite statements on the subject. Murie gives a table comparing the measurements by himself, Home, Poelman, Owen, and Turner¹; and maintains that the length of the alimentary canal depends quite as much on age, sex, &c. as on mere specific distinction. Adding to these measurements those by Yarrell², Cantor, and myself³, they give the following results:—In both species the intestine is longer in the adult male than in the adult female, but longer in the latter than in the young male. It is longer in the adult male Indian Tapir than in the adult male American, but longer in the latter than in the female Indian. But, on the other hand, there is a difference of over 20 feet between Home's and Poelman's measurements in adult Indian males; and this seems to show that the intestinal length varies so greatly as to be of comparatively little importance as a specific distinction.

Well-marked *valvuli conniventes*, about $\frac{3}{8}$ inch apart, and covered with close-set villi, extend through about the first 18 feet of the small intestine, after which they gradually fade off, the mucous membrane of the rest of the ileum being smooth. The distribution of these valvulæ differs very much from what occurs in *T. americanus*, in which Owen states that they only extend 4 or 5 inches from the pylorus.

Peyer's patches were numerous but small, some reaching to 1 inch in length, but the average size being about $\frac{1}{2}$ inch.

The cæcum (fig. 3, p. 772) resembles that of the Rhinoceros. Three muscular bands extend down it; and between these it is sacculated. The colon, which is sacculated on either side of two muscular bands, forms a loop, and then passes insensibly into the rectum, which nearly resembles it in structure. The mucous membrane of the

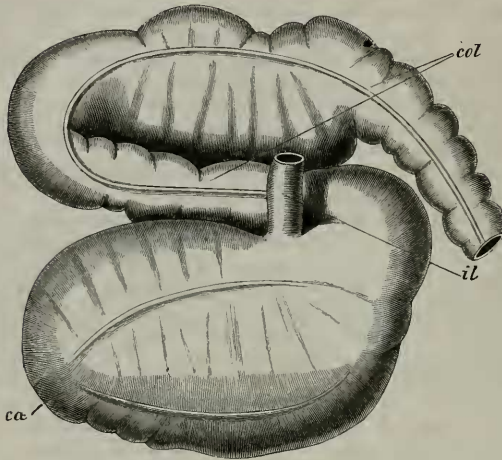
¹ Proc. Zool. Soc. 1850, p. 102.

² "Observations on the Tapir of America," Zool. Journal, vol. iv. 1828, p. 210.

³ The small intestine was 40 feet 9 inches long, the large intestine 5 feet 6 inches, and the cæcum 10 inches, measuring from the apex to the entrance of the ileum.

cæcum is raised into a close network of wrinkled folds; that of the colon and rectum is similar, but the network is not quite so close.

Fig. 3.



Cæcum and colon, from above, one sixth nat. size.

ca, cæcum; *col*, loop of colon; *il*, ileum.

The heart agreed with Poelman's and Owen's descriptions; both the subclavians come off from the innominate; and there is only one superior cava. There is no moderator band in the right ventricle; and I could find no trace of an *os cordis*. A very good figure of the heart is given in Poelman's paper. The external and internal iliacs arise separately from the aorta.

Each lung was imperfectly divided up into three lobes—a large posterior and two smaller anterior; and there was also a small azygous lobe on the right side. This differs from Poelman's description in that he states that in the right lung there is only one slight division, and he does not mention the azygous lobe.

The larynx corresponded with Poelman's description, showing the double pair of pouches figured by him.

The kidneys are not lobulated, and in longitudinal section show a large extent of the cortical part as compared with the medullary. The right was slightly longer and narrower than the left, the former measuring $5'' \times 2\frac{1}{4}''$, and the latter $4\frac{1}{2}'' \times 2\frac{1}{2}''$. The adrenals are elongated bodies about $\frac{1}{2}''$ wide, extending from the front margin of the kidney to the exit of the ureter. In section they show a yellow cortical and a brownish medullary part. The bladder has a narrow

neck ; and the ureters open close together about two thirds of the way back from its anterior end. These openings are separated by a longitudinal fold of the mucous membrane, which extends backwards as far as the veru montanum.

The animal being young, the generative organs were in such an undeveloped condition that I am unable to give a good description of them. The testes were only about $\frac{5}{8}$ inch long ; but the epididymes were large. The vesiculæ seminales were branched ; and the seminal ducts and prostates opened by numerous slit-like apertures on either side of the veru montanum. Extending for some distance behind the latter there were several irregular rows of apertures of mucous glands.

The penis (fig. 4) differed considerably in form from Poelman's figure. He describes three ridges (crêtes) or flattened pads (bour-relets aplatis) on the upper surface : these were not present ; but just

Fig. 4.



Upper surface of penis, one half nat. size.

behind the glans there was a squarish forwardly directed fold. The glans was conical ; and the lower lip of the urethral aperture projected slightly.

The brain (Plates LVIII., LIX., figs. 1-4) resembles on the whole that of the Rhinoceros and Horse ; but the convolutions are simpler, and the hemispheres relatively shorter, appearing almost round when viewed from the side ; seen from above, they do not show such a marked difference in breadth between the anterior and posterior parts as in the Rhinoceros, and in this more nearly resemble the Horse. The olfactory lobes are very large and of an oval shape, and are marked off by a groove from their peduncles. The peduncles of the